

Analysing ESG Risk in MSMEs: A Context-Sensitive Framework from Forestry Enterprises in India

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Abstract

MSMEs offer distinctive opportunities to influence sustainable development of the Indian economic structure as a result of their adaptability, scope, and local focus, yet ESG (Environmental, Social, and Governance) risk assessment remains limited to the large corporate context. This study aims to fill this gap by analyzing ESG risk landscape in MSMEs. The study conducts a qualitative analysis of data collected through a survey from 121 forestry-MSMEs situated in the Vidarbha region of India. Understanding ESG risks in MSMEs requires an approach tailored to their specific challenges and operational scale. This paper examines key ESG risks and their impact on MSMEs' strategies to manage these risks. The findings highlight that environmental exposure dominates due to ecological dependence, while governance vulnerabilities remain structurally embedded. The study contributes to ESG measurement literature by offering a context-sensitive, statistically defensible, and MSME-appropriate framework. The integration of ESG principles can strengthen the resilience of MSMEs to operational risks, improve brand reputation, and reduce costs through increased resource efficiency. However, applying a common ESG framework to MSMEs, given their contextualized nature, would be a hindrance to their contribution to sustainable development.¹ Therefore, the proposed framework conceptualizes ESG integration in MSMEs not as a compliance outcome but as a cognitive-institutional process triggered by climate exposure. By theorizing ESG familiarity as a mediating mechanism, the model explains how ESG uncertainty becomes embedded in governance structures. The study contributes a process-based explanation for how informal risk perception evolves into formal governance structures.

Keywords: Sustainability, ESG risk, MSMEs, Forestry Sector

1. Introduction

In today's world, sustainability and Environmental, Social, and Governance (ESG) are not just buzzwords; they are indispensable elements to guide our actions and decisions. Micro, small, and medium-sized firms (MSMEs) are essential conduits for attaining sustainable development goals, owing to their significant involvement in global economic activities. In addition to comprising 90% of all firms, they are responsible for two-thirds of all jobs, provide for the livelihoods of more than two billion people, and indispensable to the efficient operation of global supply networks (World Economic Forum, 2023). Despite their constrained resources relative to large firms, MSMEs make substantial contributions to employment and gross domestic product (GDP), particularly in developing nations. Given that MSMEs make up a significant percentage of the global economy, examining ESG prospects becomes essential to attain sustainable development of society.

Moreover, ESG is the progression to propagate holistic perspective towards sustainability. It provides a framework for assessing industry's broader impact on environment, society, and governance practices. It focuses on the specific factors that investors, stakeholders, and regulators look at to determine if a company is sustainable and responsible (Edmans, 2023). The United Nations Principles for Responsible Investment (UN PRI 2000) offers a framework for integrating ESG principles into company valuation and investment methods, as these criteria enhance the assessment of companies' future financial performance. Currently, 90% of investors prioritize ESG

¹ This study is part of a research project 'analyzing ESG prospects and practices in Forestry MSMEs in India', financed by the ICSSR Major Research Fund India.

performance more significantly in their decision-making than prior to the COVID-19 pandemic, and 74% are more inclined to divest from companies with inadequate ESG records, as indicated by EY's Global Private Equity Survey 2021, which examined 320 institutional investors across 19 countries (EY, 2021; Khan, 2016). Consequently, in recent years, governments and regulators globally have increasingly focused on the enforcement of corporate environmental governance and social responsibility (Zhou, 2022).

Environmental, Social, and Governance (ESG) practices have become acceptable since 2004, when the United Nations Global Compact report "Who Cares Wins" recommended their integration into the company's overall administration (United Nations, 2004). Beyond businesses and communities, ESG practices affect markets and society, helping achieve the UN's Sustainable Development Goals. They have increased business competition, transparency, and social and ethical responsibility. ESG strives to create a symbiotic relationship between environmental preservation, stakeholder interactions, and organisational governance (Shahar et al., 2020). Industrial sustainability involves integrating environmental and social responsibilities into governance (Alias et al., 2019). ESG helps firms meet the needs of shareholders, employees, clients, and communities.

Micro, small, and medium enterprises (MSMEs) have garnered significant interest from policy-makers, global donors, business associations, non-governmental organizations, development consultants, and academics. The definition of small and medium-sized enterprises (SMEs) varies by country, with no consensus on the distinctions among microenterprises (MIEs), small enterprises (SEs), medium enterprises (MEs), and large enterprises (LEs) (Tambunan, 2008).

The necessity of maintaining a balance between economic growth, environmental preservation, and social welfare has resulted in sustainability becoming an essential component of business strategy. According to the International Finance Corporation (IFC, 2019), Micro, Small, and Medium Enterprises (MSMEs) comprise a substantial proportion of global economic activity, accounting for approximately 90% of enterprises worldwide and providing over 50% of employment. Moreover, MSMEs offer distinctive opportunities to influence sustainable development as a result of their adaptability, scope, and local focus, frequently providing support to regional economies and communities in a manner that larger corporations are unable to (Revell et al., 2010). However, adopting sustainability promoting measures poses greater challenges for MSMEs compared to large enterprises, as MSMEs generally possess fewer resources, limited access to funding, and fewer incentives for regulatory compliance.

1.1 Research Gap

India has over 63 million MSMEs, most lacking formal ESG disclosures. Many MSMEs in India are excluded from ESG-linked capital or ESG-sensitive value chains due to low maturity. ESG risks like pollution penalties, labour law violations, or governance lapses already caused significant business disruption. Therefore, requires a framework to understand the risk associated with ESG for industries in general and MSMEs in particular.

Environmental, Social, and Governance (ESG) risk assessments have emerged as essential tools for businesses globally, yet remain underutilized among micro, small, and medium enterprises (MSMEs), particularly those in the forestry sector.

It is imperative that MSMEs demonstrate sustainability sensitivity in order to ensure their long-term survival. Moreover, to meet overall sustainable development goals, it is essential that MSMEs must comply with ESG principles and exhibit sustainability awareness. Scholars such as Schaper (2002) contend that sustainability for MSMEs must be perceived through a unique perspective that considers their operational limitations, localized effects, and informal organizational structure. However, there is a literature gap that prevents an in-depth understanding of the relationship between ESG risk and MSMEs. Extent research highlights that while enterprises recognize climate risks, their ESG risk remain poorly strategized, fragmented and under-developed, even as climate pressures grow, underscoring the need for integrated ESG risk framework (Nguyen., et al. 2024). Studies demonstrates that despite increasing recognition of climate risk by firms, ESG disclosure often lag behind, leading to gaps between climate risk awareness and the implementation of robust ESG strategies, a phenomenon termed "green gaps" in the literature (Dye, 2021).

Existing literature predominantly focuses on quantitative analysis of ESG scores and its impact on large corporations or urban SMEs while neglecting rural, natural resource-based enterprises. Moreover, there is limited research on how ESG risk is understood by firms. What are its impacts on development of MSMEs. This study aims to fill these gaps by analysing ESG risks through thematic indicators such as environmental awareness, social contributions, and governance structures in the forestry-MSMEs situated in the Vidarbha region of India.

India's Vidarbha region characterized by fragile ecosystems, tribal settlements, and resource-intensive MSMEs, ESG risks are both imminent and underacknowledged. This study presents a rationale for embedding ESG risk assessment into forestry-based MSMEs' strategic frameworks building, highlighting familiarity issues with respect to overall ESG, environmental degradation, socio-legal challenges, and governance lapses as central risks.

2. Literature Review

2.1 Contextual Background of Forestry Sector in Vidarbha, India

The Vidarbha region of Maharashtra, known for its extensive forest cover, serves as a critical hub for forest-based Micro, Small, and Medium Enterprises (MSMEs). These enterprises rely on non-timber forest products (NTFPs), bamboo, herbal processing, and artisanal crafts. They contribute significantly to the socio-economic fabric of the region by providing employment to marginalized communities, including tribal populations. Despite their economic importance, these MSMEs face challenges in adopting Environmental, Social, and Governance (ESG) frameworks—an essential component for sustainable business practices.

Forest-based MSMEs play a pivotal role in India's rural economy by utilizing both timber and non-timber forest products (NTFPs) such as medicinal plants, bamboo products, and lac. For centuries these MSMEs are providing avenues of growth for local, forest-surrounding settlements, who collect, process and trade bamboo, rattan, resins, gums, lac, oil seeds, essential oils, medicinal herbs, edible products, and tanning materials. These enterprises contribute nearly 30% to India's GDP while employing millions across rural areas. Vidarbha's MSMEs are particularly significant due to their dependence on fragile ecosystems and tribal labour forces. Further, justification for emerging attention towards this sector has been socio-economic and ecological benefits. According to FAO (2009), effective management of forest-based industries is essential for safeguarding forests and maintaining ecological balance. Such management reduces disturbances to forest ecosystems, particularly those arising from timber extraction. At the same time, socio-economic and political priorities have focused on promoting new development models that support the well-being of forest-dependent communities. However, the informal nature of these businesses often results in unregulated resource extraction and inefficiencies within their supply chains. This is closely associated with weak governance structures and suboptimal employee relations. Consequently, an ESG risk assessment becomes particularly relevant, as it provides a holistic framework for examining the interdependence of these factors and their implications for long-term sustainability and success.

2.2 Conceptualizing ESG Risk

The term "ESG risk" refers to the possible threats that a business may face as a result of environmental, social, and governance factors, which can affect its financial stability, operational resilience, and reputation. ESG risk encompasses Environmental, Social, and Governance risks, with environmental risk referring to uncertainties related to a firm's ecological impact, including adherence to climate change regulations, resource depletion, waste management, pollution, and legislative changes focused on environmental protection. Social risk pertains to the potential adverse effects stemming from a firm's interactions with the community and employees, adherence to human rights, implementation of health and safety protocols, labor policies, and stakeholder engagement. Governance risk pertains to the hazards stemming from executive decision-making, accountability and

transparency, adherence to regulatory requirements, leadership-related issues, and the governance framework inside the corporate structure (Chelawat, 2016; Sharma, 2019; Sinha Ray, 2023; Saini, 2023).

Research states that the ineffective administration of ESG factors is the major cause of financial unsustainability in firms (Saini, 2023; Chelawat, 2016). Sharma (2019) observed that the credit rating, operational, and reputational aspects of firms are negatively correlated with ESG risks. Sinha Ray (2023) conducted research on the ESG risk of Indian firms and determined that environmental, social, and governance-related performance are associated with uncertainties and potential financial losses. Investment in ESG compliance is more feasible for large-scale industries, which in turn mitigates the negative correlations between firm performance and ESG. The global trend toward sustainability has intensified, leading companies worldwide to recognize that addressing ESG concerns is not just a regulatory requirement but a critical aspect of risk management and long-term strategic planning (Sharma, 2019). The rise of this global phenomenon has necessitated that both global and local firms integrate ESG considerations into their operations to sustain competitiveness and meet stakeholder expectations (Saini, 2023). Moreover, corporate concerns regarding ESG risks indicate the growing importance that investors and the public place on sustainability issues (Cohen, 2023).

2.3 ESG risk in MSMEs

Research says that MSMEs face structural constraints, like limited ESG literacy (Revell, Stokes, & Chen, 2010), informal governance systems (Spence, 1999), and resource scarcity (Lepoutre & Heene, 2006). Unlike large corporations, MSMEs respond reactively rather than strategically to ESG pressures (Perrini, 2006).

For MSMEs, the principal ESG risks pertain to environmental impact (including resource utilization and waste management), social dimensions (such as equitable labor practices and community engagement), and governance (including transparency and accountability). Environmental risk refers to the potential negative impacts on a firm's operations due to environmental regulations, resource scarcity, and pollution. MSMEs often operate in industries that are highly exposed to environmental risks, such as pollution, resource depletion, and regulatory non-compliance (Sinha Ray, 2023). Social risk arises from the firm's failure to meet societal expectations in areas such as labour standards, community engagement, and product safety. MSMEs are particularly vulnerable to social risks due to their limited capacity to implement comprehensive corporate social responsibility (CSR) practices (Sharma, 2019). Governance risk pertains to risks arising from poor management practices, lack of transparency, and weak organizational structures. MSMEs must strengthen their governance frameworks to mitigate these risks and align with global ESG standards (Eccles, 2014). The integration of ESG risk in MSMEs is framed within a dynamic risk management perspective where these enterprises must balance financial performance with sustainability goals. MSMEs must develop resilience against non-financial risks, including environmental and social challenges, to reduce their vulnerability to ESG-related disruptions (Chelawat, 2016).

The theoretical framework for comprehending ESG risk in MSMEs is rooted in a variety of established theories, such as stakeholder theory, legitimacy theory, and resource-based view (RBV). Legitimacy theory posits that firms, including MSMEs, must incorporate ESG factors into their operations to satisfy stakeholders' expectations, ensure that their actions are perceived as desirable or appropriate within a socially constructed system of norms and values, justify their existence and practices by aligning with societal norms, and ultimately, to maintain their market presence and credibility (Suchman, 1995) (M. Saini, 2023). For MSMEs, this entails the adoption of ESG practices to align with changing environmental and societal standards, thus ensuring their legitimacy in competitive and regulated markets (Dowling, 1975). Stakeholder theory asserts that firms have a responsibility to manage the interests of all stakeholders, including employees, customers, suppliers, communities, and the environment (Saini, 2023). The firm's responsibility extends beyond profit generation, emphasizing the necessity of balancing the interests of diverse stakeholders through sustainable practices (Freeman, 2010; Brammer, 2006). MSMEs must address ESG risks to fulfill the expectations of diverse stakeholders, thereby ensuring long-term sustainability and enhancing relationships (Saini, 2023). The Resource-Based View posits that firms attain

competitive advantage through the development of capabilities associated with environmental and social responsibility (Hart, 1995) or by cultivating unique resources that are valuable, rare, inimitable, and non-substitutable (Barney, 1991). MSMEs can effectively navigate ESG pressures and enhance their resilience and market differentiation by utilizing unique resources and innovating in sustainability (Wernerfelt, 1984; Saini, 2023).

3. Methodology

3.1 Research Design

This study adopts a qualitative ESG risk assessment approach to evaluate the environmental, social, and governance (ESG) risk exposure of forestry-MSMEs in the Vidarbha region of Maharashtra state, India. The research design integrates primary survey data with an in-depth multiple case study of five forestry MSMEs, enabling a contextualized understanding of how ESG risks are perceived, interpreted, and managed within small-firm settings. By combining perceptual and practice-based evidence, the study captures both the subjective awareness and the operational enactment of ESG risk management in the forestry MSME sector.

The study conceptualizes ESG risk as a composite function of two interrelated dimensions: (1) the degree of exposure to sustainability-related environmental, social, and governance challenges, and (2) the strength and maturity of organizational risk management practices adopted to mitigate these challenges. This conceptualization aligns with prior scholarship emphasizing that firms' ESG performance and risk profiles depend not only on external sustainability pressures but also on internal governance and management capabilities (Robert G. Eccles et al., 2014; Mozaffar Khan et al., 2016). The study focuses on forestry-MSMEs due to their high environmental dependence and regulatory exposure, consistent with sectoral ESG materiality literature (Clark et al., 2015).

3.2 Unit of Analysis:

Individual MSMEs engaged in forestry-related activities (e.g., NTFP collection, bamboo processing, herbal product manufacturing).

3.3 Sampling Framework:

1. Population: All registered MSMEs in Vidarbha working within the forestry sector.
2. Sample Size: 121 MSMEs selected using stratified random sampling to ensure representation across diverse business types (e.g., small-scale artisans, medium-sized manufacturers).
3. The three cases were selected using a sampling method that was purposive or judgemental sampling based on typicality of the concerned cases (Yin, 1994).

3.4 Data Collection Methods

The study employs both primary and secondary data collection techniques:

Primary Data:

- Structured questionnaires designed using Likert scales to measure ESG risk understanding and practices.
- Descriptive questions focusing on environmental risks (e.g., pollution and waste management), social risks (e.g., employees related issues), and governance risks (e.g., whistle-blower policies) were developed to get deeper understanding of objectives.

- Interviews with key stakeholders such as MSME owners, managers, and employees to gather qualitative insights into ESG risk challenges, understanding and impact.

Secondary Data:

- Analysis of publicly available ESG reports, government databases, and policy documents related to forestry-based industries in Vidarbha.

Tools for Data Collection

- Face to face surveys using survey platforms GoSurvey
- Additional qualitative data collection during interview and interaction.

3.5 Conceptual basis

The ESG risk model follows the widely used ESG pillar structure:

Environmental risk

Social risk

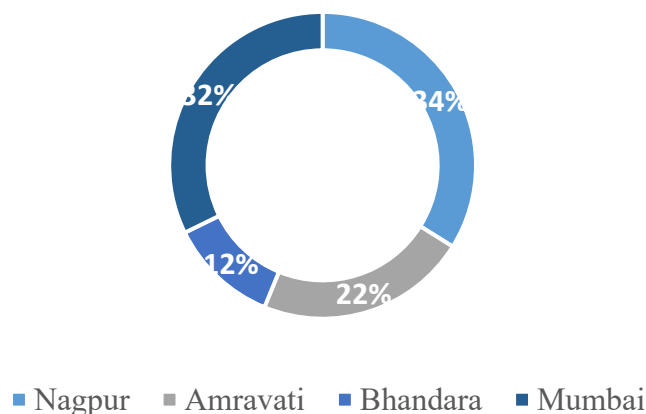
Governance risk

ESG risk is conceptualized as the degree of vulnerability arising from weak sustainability practices and governance mechanisms (Eccles et al., 2014).

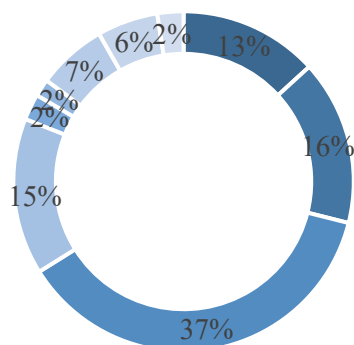
3.6 Analytical Framework

The study uses descriptive Statistics: Summarize data on ESG practices (e.g., percentages of firms adopting waste management systems). Qualitative interviews and other data sources were analysed using content and thematic analysis. Phrases, words, and paragraphs were transcribed from the interviews. The researcher entered the ‘life-worlds of the researched’ to comprehend risk understanding and knowledge generation in relation to risk management processes and its associated nuances (Yin, 1994).

3.7 Geographic Coverage: Fieldwork was conducted across major districts in Vidarbha, including Nagpur, Bandara, and Amravati. These districts were selected based on their high concentration of forestry-based MSMEs and accessibility for frequent interactions. Additionally, forest based MSMEs from Mumbai were also approached for the survey. Below chart sample spread split across geographic locations



Industry type



- Pulp/Paper
- Plywood
- Sport equipment
- Toys
- Construction materials
- Timber
- Furniture
- Biodiesel/Oil
- Handicrafts
- Match wood
- Lac
- Beedi
- Sandalwood

Natural Resources

| Resource | Avg. in Tons |
|---------------------------------------|--------------|
| Wood | 5032.5 |
| Bamboo | 49 |
| Biofuels (vegetable oil, animal fats) | 100 |
| Lumber | 80 |
| Rosewood, Teak | 36 |
| Sagun Wood | 36.75 |
| Sandalwood | 15.21 |
| Tendu Leaf | 10 |

3.7 Sampling and Response Rate

- Total Businesses Contacted: 936
- Responses Received: 121
- Response Rate: 12.7%

The response rate indicated a poor level of participation

Summary of Participating Respondents

| | Amravati | Bandara | Nagpur | Total |
|---------------|----------|---------|--------|-------|
| Medium | 19 | 9 | 19 | 47 |
| Small | 21 | 20 | 33 | 74 |
| Total | 40 | 29 | 52 | 121 |

3.8. Data Consistency and Quality Checks: The data underwent multiple validation checks:

- Missing Values: Any missing responses were flagged and handled using mean/mode imputation where necessary.
- Cross-Validation: Compared self-reported ESG practices with publicly available data and third-party ESG ratings (if available).

3.9 Ethical Considerations

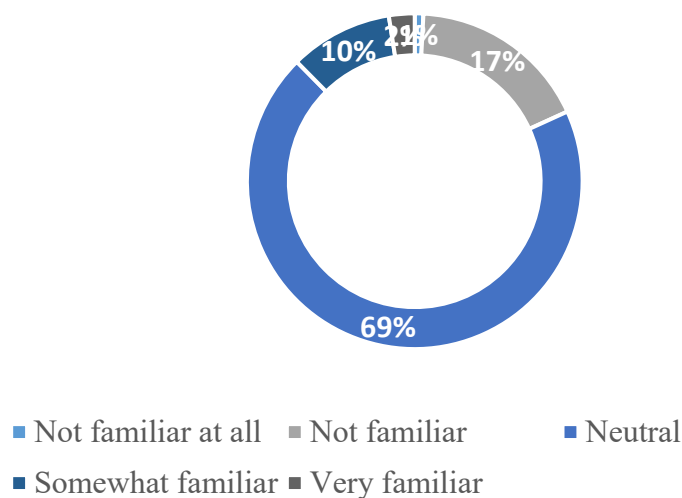
- Informed consent from participants before data collection.
- Confidentiality agreements to protect sensitive business information.
- Transparency in reporting findings without bias or manipulation.

4. Analysis:

4.1 ESG Risk Understanding in Forestry MSMEs: A Perceptual Evaluation

Q 1. How aware are the forestry MSMEs about the ESG risk?

4.1.1 Familiarity with ESG risks



The results show entrepreneurs/owners' familiarity with respect to ESG risks is at superficial level of awareness. The majority of entrepreneurs/owners do not perceive themselves as either highly informed or entirely ignorant of ESG risks, suggesting a widespread lack of profound involvement with ESG-related issues. Only a small percentage (10%) are somewhat familiar, and just 2% are very familiar, highlighting limited expertise in this area. Meanwhile, 19% of respondents (including 2% who are completely unfamiliar and 17% who are somewhat unfamiliar) demonstrate a clear knowledge gap regarding ESG risks. This suggests the need for stronger education, training, and communication efforts to ensure employees understand ESG risks and their implications for the company's long-term sustainability and compliance.

This pattern reflects cognitive distance from ESG risk constructs within the MSME context. Nevertheless, the predominance of "neutral" responses along with qualitative case study of MSMEs suggests informal awareness without institutionalized understanding.

“I don’t what ESG means, but I always contribute to protect my natural environment, participate in tree plantations and follow natural method of bamboo wood procurement without exploiting our jungles.”
(Entrepreneur in Nagpur)

Spence (1999) argued that SMEs practice “implicit CSR” rather than formal ESG integration. The high neutral response aligns with implicit rather than explicit ESG understanding.

Institutional theory (DiMaggio & Powell, 1983) is a good way to explain this because it says that organizational knowledge comes from normative and mimetic constraints. Gillan, Koch, and Starks (2021) note that ESG integration increases when there is a lot of demand from the capital and regulatory markets. The absence of such pressure in regional MSMEs contributes to cognitive inertia. In case of MSMEs, ESG disclosure mandates are limited and still in nascent stage or emerging. Consequently, weak institutional pressure can explain the low proportion (12%) of high familiarity.

In case of natural-resource based industries like forestry, resource depletion impact is not immediate hence, as Revell, Stokes, and Chen (2010), also found that small firms react to environmental regulation only when directly affected. Deforestation is a reality, however not experienced by industries on an everyday basis. Hence, limited experiential exposure to ESG-risk-related consequences led to deferred decision-making.

In the survey, the dominance of neutral responses is theoretically significant. Perrini (2006), argues that SMEs lack formal sustainability articulation despite engaging in some responsible behaviors. Here in case of forestry MSMEs, majority has shown some kind of understanding about good practices. However, their articulation is in local understanding not institutionalized for a sophisticated audience. Neutrality therefore reflects cognitive disengagement rather than total ignorance. For example,

“We talk about responsible practices and community welfare, but we have not defined it as ‘risk.’ We know regulations matter, such as we do follow permit limits and laws of the land, but linking them with risk terminology is new to us.” (Manager of Bamboo manufacturing medium scale firm)

This reflects implicit sensemaking where ESG activities are practiced but not conceptualized as risk constructs, consistent with Grant (1996) and managerial cognition literature. Managers describe compliance (“getting permits,” “doing what regulators require”) instead of articulating risk, indicating internal operational framing rather than strategic risk framing (Lepoutre & Heene, 2006).

Implication of low familiarity for MSME growth.

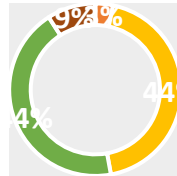
Thus, the findings are not anomalous but theoretically consistent with established SME sustainability research (Soundararajan et al., 2018). As per the extant research low awareness may amplify:

- Regulatory vulnerability
- Reputational exposure
- Compliance risk
- Supply chain exclusion

However, given rising regulatory and supply-chain ESG pressures, this cognitive gap represents a significant latent risk.

A further awareness-related inquiry examines how firms perceive the implications of not engaging with ESG risks. The responses to this question are summarized in the chart below.

4.1.2 Potential risks associated with not implementing ESG practices



- regulatory penalties
- reputational damage,
- loss of investor confidence
- decreased competitive positioning.

From the data, 44% of respondents say that harm to reputation and loss of investor confidence are the biggest dangers of not properly implementing ESG. This shows how important these risks are for both finances and brand. Interestingly, only 9% see regulatory penalties as a big danger. This suggests that concerns about compliance are less important than concerns about reputation and trust from investors. Eccles, Ioannou, and Serafeim (2014) also show that a company's long-term worth is affected by its sustainability performance through its reputation and the trust of investors. So, it is clear that MSMEs know about reputational risk, but they don't know much about ESG risk structured frameworks. Additionally, with just 3% recognizing competitive positioning as a risk, it appears that businesses prioritize external perceptions over direct market competition when assessing ESG failures. This indicates that while companies acknowledge the importance of ESG in maintaining credibility, they may underestimate its role in securing a competitive edge. This is in line with what research says about SMEs, which says that they do environmental practices reactively instead of strategically (Revell, et al., 2010). ESG can create shared value and strategic differentiation. However, forestry MSMEs appear to interpret ESG primarily as a defensive legitimacy mechanism rather than a strategic resource or a systemic risk management tool. It is a kind of institutive cognition of the phenomena embedded in their social system.

The case of Medium Bamboo Processing Unit, Nagpur MIDC reiterate the similar perception.

“In our business, reputation spreads fast. If buyers feel we are not following environmental norms, or not taking care of forests, word goes around in the trader network. Even if legally nothing happens, our name suffers.”

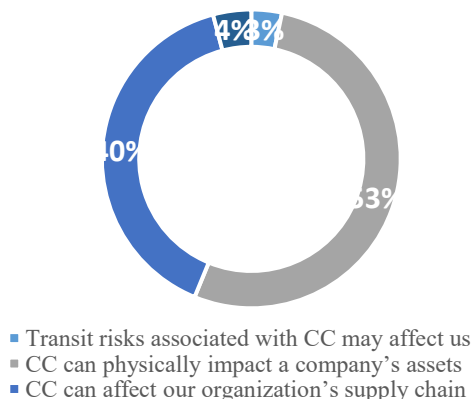
Another quote from case 2 “Customers today ask whether the wood is legally sourced. If someone doubts our practices, it directly affects trust. That risk worries us more than penalties.” (owner of Small Timber Trading MSME, Bhandara). Here, reputational risk is perceived as immediate and market-facing, but in informal way. In another instance, wherein formal set up also incorporate informality of relationship as

“When we approach banks or private investors, they now ask about sustainability compliance. If we cannot explain it properly, funding becomes difficult.” (Manager at Export-Oriented Bamboo Furniture MSME) and Second-Generation Forestry Entrepreneur “Investors are more cautious now. They want assurance that we won't face environmental controversies. If they lose confidence, expansion plans stop.”

Such utterances are common while interacting with the managers, owners and employees of these firms, which clearly reflects strong sensitivity to informal legitimacy pressures, consistent with institutional theory (DiMaggio & Powell, 1983).

Since majority of respondents are very vocal about environment component of ESG, the specific question about environment when asked, following responses received.

4.1.3 Risks associated with climate change (CC)



A majority 53% of respondents think that climate change can have a tangible effect on a company's assets, which shows that they see a serious risk to infrastructure and operations. Also, 40% say that climate change could impair their organization's supply chain. This shows how climate-related disruptions can pose operational risks, such as resource shortages and transportation problems. Only 7% of people (4% who said they were worried about transportation concerns and 3% who said they hadn't thought about the risks) said they didn't think climate change was a big deal. This suggests that most people who answered the survey do think it's important. These results show that a lot of people know about the business risks that come with climate change, but more tests and plans to reduce such risks may be needed to be fully ready. At this level, it reveals that Forestry MSMEs are especially worried since their raw material, which is forest, depends on the weather, their processing equipment is built in a certain place, and climate-related problems will affect their storage and logistics. The finding is consistent with Busch & Hoffmann (2011), who found that firms in environmentally intensive sectors demonstrate higher climate risk awareness. Similarly, Revell, Stokes & Chen (2010) demonstrate that SMEs become environmentally responsive when their supply chain is at risk.

This is also about media generated awareness about measurable impacts of climate change on human life. The research findings overall support risk perception theory (Slovic, 1987), which posits that risks perceived as tangible and immediate generate stronger cognitive engagement. Same is found in qualitative case analysis such as Timber Sawmill Owner elaborates in his words:

“Irregular monsoons, which become regular pattern in recent years, changes the quality of wood. When that happens, our processing machinery also faces issues. So yes, climate affects our physical operations.”

Manager at Bamboo Processing MSME, Nagpur MIDC emphasises the same:

“In the last few years, unpredictable rains have affected our storage conditions. If raw bamboo gets wet, it damages the stock. Climate change is directly affecting our assets.”

At present climate risk is well recognized with its impact on business by these MSMEs, it can be a step towards ESG institutionalization.

The finding that 93% of respondents acknowledge either physical or supply chain climate risks demonstrates that climate change is cognitively proximate to forestry MSMEs. This aligns with natural-resource dependence logic (Pfeffer & Salancik, 1978), where firms embedded in ecological systems perceive environmental volatility more acutely.

The high recognition of physical asset risks (53%) is theoretically consistent with climate risk literature (e.g., physical risk exposure frameworks). Forestry-based MSMEs operate with direct exposure to:

- Timber yield variability
- Weather-sensitive transport networks
- Seasonal labor dependence
- Storage and moisture-related degradation

This supports arguments in business ethics scholarship that firms' moral and strategic attention is often triggered by immediate material exposure rather than abstract normative commitments.

Although, climate awareness alone does not equate to systematic ESG capability, it does lead to understanding and then structuration of measures in the form of ESG. Dynamic capabilities theory (Teece, Pisano, & Shuen, 1997) further facilitate understanding that firms integrate, build, and reconfigure internal competencies to address environmental change. ESG literacy facilitates this process by:

- Formalizing risk identification systems
- Integrating sustainability into strategic planning
- Codifying climate exposure into everyday operations through governance processes and employee training.

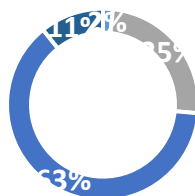
It is important for MSMEs to develop ESG structured model to face the ESG risks. Although climate risk perception may directly prompt reactive adjustments (e.g., diversifying suppliers), such responses remain fragmented without structured governance integration. ESG familiarity functions as a cognitive development of the required mechanism that converts experiential climate exposure into systematic preparedness. Drawing on the knowledge-based view of the firm (Grant, 1996), risk preparedness depends on the firm's ability to process, interpret, and institutionalize knowledge. Climate risk perception alone represents stimulus recognition; ESG familiarity enables codification and routinization. Empirical evidence indicates that sustainability knowledge mediates the relationship between environmental uncertainty and strategic adaptation (Delmas & Toffel, 2008; Bansal & Roth, 2000). Accordingly, ESG familiarity is expected to transmit the effect of climate risk perception onto risk preparedness.

4.2 ESG Risk Understanding in Forestry MSMEs: A Practical Evaluation

Q. 2 How do MSMEs prepare to respond to ESG risks?

This section analyses the ESG risk mitigation practices of forestry-MSMEs in the Vidarbha region using survey-based descriptive statistics and interviews of owners and managers of the forestry-MSMEs.

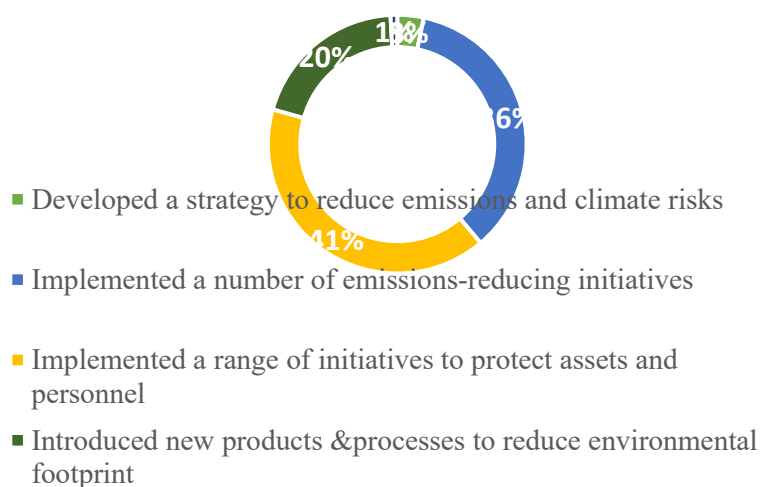
4.2.1 Current practices to manage ESG risks



- carbon reduction initiatives ■ supply chain audits
- employee safety protocols, ■ governance standards

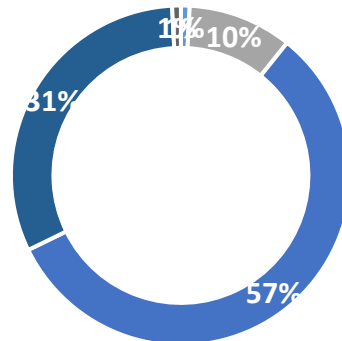
The figure indicates how important ESG factors are to the organization. It shows that 63% of firms put carbon reduction projects at the top of their list, which shows that environmental sustainability is the most important part of ESG risk management. 25% of those who answered said they do supply chain audits, which shows that governance and accountability are important, but not as important as cutting carbon emissions. Only 11% of the respondents focus on employee safety regulations, and only 2% focus on governance standards. This suggests that the social and governance parts of ESG risk management may not be as well-developed as the environmental ones. This kind of skewed priority is in line with what the SME sustainability literature says: small businesses are more likely to embrace environmental policies that are visible and motivated by compliance than systemic governance or social interventions (Revell et al., 2010; Hillary, 2004).

4.2.2 Action to mitigate the risks associated with climate change



A total of 77% of firms (41% focusing on activities to reduce emissions and 36% implementing climate risk strategies) have taken strategic and operational steps to reduce climate risks. This shows that they are very committed to sustainability efforts. Also, 20% have come up with new goods and procedures to lower their environmental impact. This shows how important innovation is in dealing with climate problems. But only 1% have set an internal carbon price, and another 1% have done nothing, which shows that while most companies are working hard to make themselves more resilient to climate change, financial tools like carbon pricing are still not being used very much. Climate governance literature identifies three levels of maturity (Kolk & Pinkse, 2008), which can help us understand this. 1. Actions to make sure rules are followed and work is done efficiently; 2. Operational integration; and 3. Strategic climate governance. The survey data shows that the climate governance level in the MSMEs analyzed is either level 1 or 2, while level 3 is not present. This distribution indicates that the majority of forestry MSMEs are still at an operational or reactive level of climate responsiveness, rather than strategic integration. So, the results back up the idea that ESG risk in MSMEs is not completely non-existent, but rather not well-structured in the mind.

4.2.3 Tools or frameworks used for ESG risk management



- ISO 14001
- Global Reporting Initiative (GRI)
- Sustainable Accounting Standards Board (SASB)
- Task Force on Climate-related Financial Disclosures (TCFD)
- Carbon Disclosure Project (CDP)

57% of firms use the Sustainable Accounting Standards Board (SASB), which shows that standardized ESG reporting that is in line with financial materiality is crucial. In addition, 31% of them follow the Task Force on Climate-related Financial Disclosures (TCFD), which shows that they care a lot about being open about the financial effects of climate risk. However, just 10% of people use the Global Reporting Initiative (GRI), and only 1% use ISO 14001, CDP, or other frameworks. This suggests that environmental impact tracking and broader ESG reporting are not as important as financial and climate-related disclosures.

The survey results reveal a pattern that is extensively established in SME sustainability studies. SMEs favors process-oriented standards rather than reporting frameworks (Hillary, 2004; Graafland & Smid, 2019). The theoretical rationale is grounded in institutional closeness (DiMaggio & Powell, 1983):

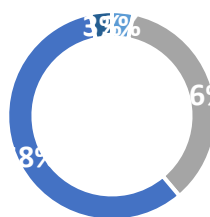
- ISO 14001- production-adjacent, certifiable, purchaser-oriented
- GRI/TCFD- investor-focused, disclosure-heavy, tailored for large enterprises.

Consequently, forestry MSMEs conform to standards that:

- influence market accessibility
- affect supply chains
- pertain to operational oversight

This substantiates the conceptual argument that MSMEs implement substantive ESG practices without formal communication, resulting in apparent gaps in external ESG understanding.

4.2.4 Input to assess ESG risks



- Stakeholder Meetings ■ ESG Audits
- Feedback Mechanism ■ Public Consultations:

A majority (58%) of firms collect stakeholder input via stakeholder meetings, demonstrating a pronounced preference for direct interaction and dialogue in ESG decision-making. Forestry MSMEs depend mostly on informal meetings instead of organized feedback or participatory processes. Also, 36% of the people who answered said they use ESG audits, which shows how important systematic evaluations are for figuring out ESG risks and compliance. However, only 6% (3% using feedback systems and 3% taking part in public consultations) use other approaches. This suggests that formal meetings and audits are the main ways that ESG risk assessment is done. This shows that there is a chance to use different ways to get people involved, such as using digital feedback tools and community consultations, to make ESG more responsive and open to everyone.

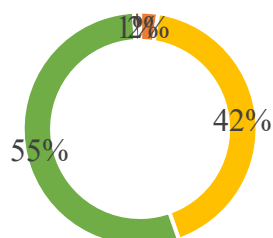
Research on SME communication shows that in small businesses, interactions between stakeholders are generally informal and based on relationships rather than formal rules (Spence, 2016). This exemplifies relational governance logic, when trust-based interactions replace formal ESG communication channels (Jenkins, 2006).

However, lack of feedback systems suggests limited:

- accountability
- monitoring
- stakeholder voice integration

which may weaken ESG risk detection.

4.2.5 Employee Training for ESG risk management



- Yes, regularly ■ Occasionally
- No ■ Planned for the future

55% of companies give their employees ESG risk management training from time to time, and 42% do it on a regular basis. This shows that they are quite committed to ESG education. Only 1% plan to add ESG training in the future, which shows that most businesses have already started to do so. Also, only 2% said they don't offer any ESG training, which shows that most people agree that being aware of and trained in ESG risk management is very important. The data also show a big gap in ESG governance: most forestry MSMEs don't have a method for keeping an eye on things.

4.3 Integrated Interpretation: ESG Risk Posture of Forestry MSMEs

Synthesizing all charts, forestry MSMEs exhibit a characteristic ESG profile:

| Strengths | Weaknesses |
|----------------------------------------|---------------------------|
| Environmental awareness (carbon focus) | Governance systems |
| Operational climate actions | Monitoring and metrics |
| ISO-based environmental management | Strategic ESG planning |
| Informal stakeholder engagement | Social dimension emphasis |

This study demonstrates an imbalance in the forestry MSMEs' perceptions about three aspects of ESG. This is in line with the well-known fact that small and medium-sized businesses (SMEs) are more likely to embrace environmentally visible and regulation-proximate sustainability practices initially, especially those related to energy use or emissions (Revell et al., 2010). People frequently think of environmental activities as being directly related to how things are made, cost-saving (efficiency logic), and being required by buyers and regulators. On the other hand, governance and social practices are more abstract, institutional, and based on skills (Jenkins, 2006; Spence, 2016). This shows that firms are making strides on climate action, but a more balanced approach that includes improvements to social welfare and governance might make their entire ESG strategy stronger..

The qualitative study also reiterates the survey results, such as entrepreneur of Bamboo products exporter says that “Export clients demand chemical safety compliance. Hence, we shifted to eco-friendly preservatives to meet European standards.” Similarly, “Since our raw material depends entirely on bamboo sourcing, we maintain traceability records. We only procure from suppliers who follow regulated harvesting cycles” owner of small-scale Bamboo products manufacturers confirms. In forestry MSMEs specifically, environmental risk salience is naturally high because forestry MSMEs’ operations are resource-dependent, regulatory exposure relates to forest and climate policy, and buyers increasingly demand environmental compliance.

In the domain of social risk management, forestry MSMEs exhibit a relatively clear and pragmatic understanding of responsible labor practices. The owner of a bamboo manufacturing unit, whose workforce largely comprises local employees, emphasized the importance of structured employment practices: “We follow government-fixed working hours and ensure timely wage payments to avoid labor-related risks.”

This indicates an understanding that consistent working conditions and timely remuneration are not only legal requirements but vital strategies for reducing operational and reputational hazards. The owner of a medium-scale export-oriented enterprise, actively involved in local forest development projects, expressed a performance-centric perspective on social responsibility: “We believe that social responsibility is practical; when workers feel secure, productivity rises.”

This viewpoint conceptualizes social responsibility not as a mere abstract obligation but as a strategic operational strategy. Collectively, these observations indicate that in forestry MSMEs, social risk management is integrated into routine managerial procedures, wherein employee wellbeing is intricately connected to productivity, stability, and long-term economic viability.

However, the low emphasis on governance indicates limited formalization a known structural characteristic of MSMEs (Spence, 2016). As explained by the owner of Wood product manufacturer from Bhandara district, “Export documentation requires strict compliance. We have to do it, so we do. Otherwise, it is costly for us.”

Another crucial aspect related to the evolution of ESG risk management among forestry MSMEs is the gradual formalization of governance mechanisms. A medium-scale manufacturer from Nagpur reflected on this transition:

“Earlier, decisions were verbal. We were a close-knit community. Now, people want documents, so we document procurement and supplier agreements to reduce disputes.”

This transition from relational, trust-based coordination to formalized contracts signifies a change in working methodology that demonstrates a type of structured governance. Formalization reduces uncertainty in procurement procedures, alleviates contractual conflicts, and improves operational transparency. Empirical evidence corroborates this observation. Choi, Phan, and Choi (2020) illustrate that formal governance processes, such as comprehensive contracts, improve interfirm coordination and performance by clarifying expectations and mitigating opportunistic behavior.

However, the movement toward formalization in MSMEs is not internal evolution, rather often shaped by external compliance oriented. Therefore, shows the mix pattern of semi-formalized risk management systems. Wherever there are regulatory and institutional pressures, these firms adhering to the formalized form of governance. As the owner of a sawmill noted: “GST compliance and audit requirements have forced us to streamline our governance practices. But our work within our network runs on verbal commitments and familiarity of each other’s work culture.” Here, informal relational norms continue to coexist with increasing procedural documentation. This hybrid arrangement reflects an adaptive response to institutional pressures while retaining embedded community-based governance practices.

Thus, the observed pattern reflects what sustainability scholars describe as selective ESG adoption, where SMEs engage in “pragmatic environmentalism” rather than integrated ESG management (Brammer et al., 2012). However, what is required to succeed the environment protection a balance amalgamation of three components of ESG.

The findings broadly confirm established MSME sustainability literature, such as environmental dominance in MSMEs (Revell et al., 2010), Informal ESG governance (Spence, 2016), Operational sustainability bias (Johnson & Schaltegger, 2016) and Limited ESG reporting adoption (Hillary, 2004). Whereas it also contradictory to studies showing increasing SME ESG formalization in export sectors owing to the demands of the market (Morsing & Perrini, 2009).

Risk Preparedness represents the outcome construct. It refers to the degree to which firms establish formal or semi-formal mechanisms to anticipate, mitigate, and adapt to climate-related risks. In MSMEs, preparedness may include:

- Unwritten risk mitigation policies
- Diversification strategies for supply chains
- Climate-adaptive production planning
- Integration of environmental considerations into financial decision-making
- Communication mechanisms with stakeholders regarding sustainability practices

The dynamic capabilities hypothesis (Teece et al., 1997) elucidates how enterprises react to environmental volatility. Adaptation requires a sense of risks, the exploitation of opportunities, and the reallocation of resources. Familiarity with ESG enhances these processes by integrating climate risk into governance frameworks instead

of perceiving it as a sporadic disturbance. Consequently, readiness signifies institutionalization: ESG risk is assimilated into planning, monitoring, and strategy evaluation procedures.

Existing MSME sustainability study indicates that insufficient ESG understanding among small enterprises considerably increases many types of organizational risk. Previous research consistently shows that SMEs have limited cognitive framing of sustainability due to resource limitations, informality, and inadequate institutional integration (Jenkins, 2006; Perrini et al., 2007; Spence, 2016). In these circumstances, ESG awareness serves as a fundamental precursor to risk identification and strategic action. Thus, insufficient awareness may exacerbate several interconnected vulnerabilities:

- **Regulatory vulnerability:** MSMEs with limited structured sustainability cognition struggle to interpret regulatory bodies suggested environmental and labour regulations, increasing exposure to penalties and operational disruptions (Revell & Blackburn, 2007; Del Brío & Junquera, 2003).
- **Reputational exposure:** Absence of ESG awareness constrains proactive stakeholder engagement and transparency practices, undermining legitimacy and trust among communities and buyers (Spence & Rutherford, 2003; Perrini et al., 2007).
- **Compliance risk:** Informal governance and weak documentation systems in low-awareness MSMEs impede compliance with certification, traceability, and reporting requirements (Jenkins, 2009; Gadenne et al., 2009).
- **Supply-chain exclusion:** Increasingly, lead firms impose ESG standards on suppliers; MSMEs lacking awareness are more likely to be excluded from sustainable procurement networks (Lee, Herold & Yu, 2016; Soundararajan et al., 2018).

Contemporary institutional dynamics indicate that this awareness deficit now represents a latent strategic risk rather than simply a developmental gap. Global supply chains, sustainable procurement standards, and new transparency rules are increasingly imposing ESG obligations on small suppliers (Lee et al., 2016; Soundararajan et al., 2018). In such circumstances, companies that stay oblivious to ESG hazards encounter a cumulative disadvantage: they are concurrently less equipped for compliance and less discernible to conscientious purchasers. This results in a discrepancy between organizational cognition and environmental expectations, increasing the likelihood of disruption and exclusion, as characterized by institutional theory.

Another critical awareness-related dimension concerns firms' understanding of the consequences of not engaging with ESG risks. Survey responses reveal that many forestry MSMEs underestimate the long-term implications of ESG neglect, particularly regarding market access, certification eligibility, and regulatory exposure. This perception gap reinforces prior findings that SMEs often prioritise immediate operational survival over intangible sustainability risks (Revell & Blackburn, 2007; Spence, 2016). Collectively, these results reinforce the argument that ESG risk in MSMEs is strongly mediated by cognitive awareness. Low awareness not only reduces risk recognition but also constrains capability development, thereby amplifying regulatory, reputational, compliance, and supply-chain risks. In emerging regulatory environments such as India's forestry sector, this cognitive gap represents a significant latent ESG risk with implications for firm resilience and long-term legitimacy.

This gap suggests a mediating mechanism:

ESG Risk Perception → ESG Familiarity → Risk Preparedness

In the above conceptual figure, solid arrows represent hypothesized positive relationships. ESG Familiarity is proposed as a mediator, that may result into positive outcome. If MSME owner/entrepreneurs become aware about the ESG and its components, chances of disbalance between the three could be reduced.

Drawing from stakeholder theory (Freeman, 1984) and institutional theory (DiMaggio & Powell, 1983), ESG familiarity develops when:

- External stakeholder pressure increases,
- Normative professionalization spreads,
- Regulatory systems formalize disclosure requirements.

Forestry MSMEs in Nagpur operate within relatively low institutional pressure environments compared to listed firms. Consequently, ESG risks are perceived experientially, but ESG is interpreted as a reporting language rather than a managerial system. This supports research arguing that ESG in emerging-market MSMEs remains compliance-adjacent rather than strategically embedded.

5 Conclusion

ESG poses a significant risk to MSMEs, although it also provides opportunity to these enterprises who adopt sustainability early in their development. MSMEs can invest in sustainability and gain a competitive edge. Research shows that MSMEs may need to use ESG criteria to reach their sustainable development goals. This would make them more flexible and able to handle economic instability. ESG activities, especially those related to the environment, have shown that they can reduce operational risks and get more stakeholders involved. This helps smaller businesses become more competitive and sustainable over time.

Overall this research proposes that in forestry MSMEs:

- ESG risk perception in MSMEs is uneven.
- Environmental components are more cognitively embedded than governance or social dimensions.
- Formal ESG frameworks are not yet institutionalized.

The findings highlight that environmental exposure dominates due to ecological dependence, while governance vulnerabilities remain structurally embedded. The study contributes to ESG measurement literature by offering a context-sensitive, statistically defensible, and MSME-appropriate framework. The integration of ESG principles can strengthen the resilience of MSMEs to operational risks, improve brand reputation, and reduce costs through increased resource efficiency. However, applying a common ESG framework to MSMEs, given their contextualized nature, would be a hindrance to their contribution to sustainable development.

Therefore, the proposed framework conceptualizes ESG integration in MSMEs not as a compliance outcome but as a cognitive-institutional process triggered by climate exposure. By theorizing ESG familiarity as a mediating mechanism, the model explains how ESG uncertainty becomes embedded in governance structures.

Working together with NGOs or government initiatives can help MSMEs get the expertise, resources, and tools they need to manage ESG risks well. These initiatives help MSMEs by setting clear ESG benchmarks that are both measurable and compatible with global standards.

Incorporating sustainability from the outset ensures its growth and evolution in line with the MSME. Not all ESG concerns are relevant to every firm; therefore, choosing areas where the firm can effectuate significant change becomes crucial. This requires asking right questions.

Therefore, the findings support the study's core proposition that:

ESG risk in forestry MSMEs does not stem from lack of environmental action but from the uneven integration of ESG pillars and limited strategic formalization.

Implications for ESG Research in MSMEs

This study advances ESG scholarship in three ways.

First, it shifts focus from large, listed corporations to MSMEs, which constitute the majority of firms globally but remain underexamined in ESG research.

Second, it conceptualizes ESG adoption as a cognitive and institutional process rather than purely regulatory compliance.

Third, it provides a process-based explanation for how informal risk perception evolves into formal governance structures.

Future contribution

Future research and policy development should prioritize the establishment of accessible ESG frameworks, incentives, and support networks to assist MSMEs in developing ESG familiarity, cognitive awareness and practice consistency. An in-depth analysis of ESG's influence on non-financial performance indicators in MSMEs, including employee welfare and community engagement, and its relationship with long-term economic sustainability would be a prudent initiative. It provides a mediation model appropriate for SEM testing in quantitative research. For qualitative research, it provides a process-tracing lens to examine ESG institutionalization pathways.

Expanding these insights can further clarify the pathways through which ESG integration aids MSMEs in thriving sustainably, being a true contributor towards the sustainable development.

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